2.0 AFFECTED ENVIRONMENT

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2.0 Affected Environment

2.1 Physical Environment[12]

The pipeline release and resulting fire affected the Hanna Creek and Whatcom Creek watersheds. Hanna Creek and the upper reaches of Whatcom Creek are terraced and steeply incised, with several significant waterfalls (Figure 10). Whatcom Creek starts at Lake Whatcom and flows westerly for approximately four miles through suburban and urban sections of the City of Bellingham before discharging into Bellingham Bay. As the Creek approaches the bay, the current slows and the channel and riparian habitats become progressively more modified and degraded (AR #7).

The Whatcom Creek watershed encompasses a total area of 32,251 acres, including the Lake Whatcom basin and Whatcom Creek drainage (AR #20). Land use in the Lake Whatcom watershed is a mix of urban/suburban and forestry uses, with approximately 30% of the watershed zoned for residential and commercial development (AR #20). The City of Bellingham supplies water to its residents and several additional water districts from an intake located in the northwest end of the lake. A dam and spillway at the lake outlet was built in 1937 to maintain lake levels and prevent downstream flooding along the Creek. The City of Bellingham measures daily stream flows into the Creek from the control dam at the outlet of Lake Whatcom. This measurement point is located below the diversion to the Whatcom Falls trout hatchery.[13] An average of the monthly flows during a two-year (1997-1998) period was found to range from a low of 24 cubic feet per second (cfs) in September to a high of 448 cfs in January (Figure 11). The average annual flow during this two-year period was 127 cfs (AR #15).

The drainage area downstream of Lake Whatcom is approximately 5,800 acres and is comprised of surface runoff from five associated sub-basins: Park, Hanna, Cemetery, Lincoln and Fever creeks (AR #20). Whatcom Creek forms the central habitat corridor extending from the lake to Bellingham Bay and has recently been the subject of a master planning process that aims to enhance its habitat (AR #7, 16, 17) and recreational values (AR #8, 9).

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[12] Information used in drafting this section includes Stone's Master's Thesis on the Incident (AR #5), Nahkeeta Northwest 1995 (AR #7), the City of Bellingham's Watershed Master Plan (AR #16), Shoreline Management Master Program 1988 Update (AR #18), and the 1995 City of Bellingham Master Plan (AR #19), the draft restoration plan proposed by the Company (AR #15), the Whatcom Creek Waterfront Action Program (AR #17), and Thayer's 1977 report on salmon rearing potential in Whatcom Creek (AR #21).

[13] Stream flows diverted to the fish hatchery typically range from about 3 to 4 cfs depending on their level of production. Outflow from the hatchery is returned to the Creek downstream of the lake outlet. The total volume of water returned from the fish hatchery to the Creek is measured and added to the lake outlet flow data to derive stream flows for the mainstem of the Creek (AR #15).

Land use in the Whatcom Creek watershed ranges from parkland to industrial uses. The upper portion of the watershed is a mix of residential use and parkland, while the lower portion of the watershed has been developed for commercial and residential uses. Although highly developed, the watershed contains several important habitat blocks including the 240-acre Whatcom Falls Park, Hanna and Cemetery creeks, and portions of the Sehome Arboretum. The Creek itself is recognized as a "Shoreline of the State" under the Shoreline Management Act of 1971 (Wash Admin. Code § 172-26 and RCW § 90.58.200) (AR #18).

2.2 Stream Habitats and Fisheries

Six species of anadromous salmonids and trout utilize portions of Whatcom Creek for spawning and rearing, including fall chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), pink (*O. gorbuscha*) and chum salmon (*O. keta*) as well as winter steelhead (*O. mykiss*), brook trout (*Salvelinus fontinalis*) and coastal sea-run and resident cutthroat trout (*O. clarki*) (AR #7,21). Incidental observations of juvenile sockeye salmon (*O. nerka*) have also occurred in the Creek, but these fish are believed to be strays from the kokanee (landlocked sockeye) stocking program upstream in Lake Whatcom rather than progeny from returning anadromous fish (AR #10). Resident life-history forms of rainbow and cutthroat trout also occur in the Creek. Many other fish species are known to use the Creek. The most abundant non-salmonid fishes include sculpin (*Cottus* sp.), stickleback (*Gasterosteus* sp.), and lamprey (*Lampetra* sp.) (AR #10).

Current levels of salmonid fish populations in the Creek are the result of improvements in access for migratory adults, habitat restoration, and extensive hatchery plants that were initiated in the early 1980s and continue to this day (AR #5, 15, 24). Some of the returning hatchery fish are now spawning naturally in the Creek. The most heavily utilized spawning area occurs in the low gradient section of the Creek between the Woburn Bridge and the confluence with Lincoln Creek (AR #15). Use of this area was enhanced in the mid-1990s when the residents of Bellingham installed a fish ladder near Meador Avenue (AR #24). Sea-run and resident cutthroat trout also use Cemetery Creek for spawning and juvenile rearing habitat (AR #27). Juvenile steelhead, coho, and chinook salmon also rear in Cemetery Creek (AR #10).

The pre-Incident quality of fish habitat varied significantly along Whatcom Creek (AR #7). Above Woburn Street, the stream and riparian areas were relatively pristine, with large sections of natural habitat. Large conifers provided a source of shade and woody debris. Habitat diminishes as the Creek flows toward Interstate 5 with a decline in native riparian vegetation and progressively greater channelization. From Interstate 5 to Bellingham Bay, the Whatcom Creek floodplain narrows to a thin corridor averaging 100 feet in width. Below Interstate 5, the stream course is channelized, lacking in habitat diversity and, in places, retained by riprap and gabion walls. Streamside vegetation is also limited and primarily shrub-dominated, with blackberries and occasional cottonwood, alder, and few conifer trees. Much of the stream has been invaded by reed canary grass, which, in places, chokes the stream channel. In the years preceding the Incident, however, portions of the lower riparian area were improved through revegetation and invasive-plant control efforts (AR #5, 24).

2.3 Surface Water

Whatcom Creek originates from an overflow dam in a shallow embayment near the northwest end of Lake Whatcom. The surface waters of the lake heat up during the summer resulting in seasonally high water temperatures in the Creek. Stream waters cool as they flow through the Park, but the Creek is still warm enough to be sub-optimal habitat for Pacific salmon, and therefore warrants listing on the Washington State list of impaired waterbodies submitted to EPA pursuant to § 303(d) of the Clean Water Act (33 U.S.C. §§ 1251, *et seq.*) (www.ecy.wa.gov/programs/wq/303d/1998/wrias/1998_water_segs.pdf).

2.4 Estuarine Habitats

The Creek flows through the City of Bellingham's downtown area and into Bellingham Bay. Bellingham Bay is an urban estuary and the Whatcom waterway is lined with industrial and commercial activities. Water quality conditions in the Bellingham Bay estuary are improving. Within the last ten years, secondary treatment facilities have been established for domestic wastes of the City of Bellingham and the industrial effluents of the Georgia Pacific pulp and paper mill.[14] The areas of Bellingham Bay used for log rafting are decreasing, reducing stress on intertidal and benthic habitats. Efforts have been underway for several years to coordinate the cleanup of Bellingham Bay though a project called the Bellingham Bay Demonstration Pilot Project. The final environmental impact statement (EIS) for the project was published in October 2000 (AR #28).

Bellingham Bay is an important estuary and provides habitat for fish, invertebrates, birds and marine mammals (AR #7). The bay is an important transition zone for the movement of juvenile salmonids from the Nooksack River. Bellingham Bay also has a rich variety of resident fish and benthic and intertidal invertebrates. One benthic species, Dungeness crab (*Cancer magister*), is in adequate numbers to support a commercial fishery. The bay is part of the north-south migratory flyway for western birds and is also an important wintering ground. Sightings of cetaceans (whales) in Bellingham Bay are uncommon, but killer whales (*Orcinus orca*) and gray whales (*Eschrichtius robustus*) are occasional visitors. Pinnepeds, including harbor seals (*Phoca vitulina*) and sea lions (*Zalophus californianus*), are commonly observed.

2.5 Forest and Wildlife Habitat

Forested land is limited within the urban boundary of the City of Bellingham, as residential and commercial developments have fragmented habitats. In the center of the watershed is the Park and associated undeveloped open space. To the south edge of the watershed, the upper Hanna and Cemetery Creek watersheds provide hundreds of acres of combined alder, mixed, and coniferous forests. These forests extend south over Samish Hill to Lake Padden Park and east into the contiguous block of Lookout Mountain. This connectivity is crucial in maintaining breeding populations of forest species with large home-range requirements such as pileated woodpecker (*Dryocopus pileatus*) and bobcat (*Lynx rufus*), and also allows for occasional

[14] The pulp mill closed in April 2001, but tissue manufacturing continues at Georgia Pacific.

occurrence of deer (*Odocoileus* sp.), elk (*Cervus elaphus*), black bear (*Ursus americanus*) and cougar (*Felis concolor*). Common urban mammals such as raccoons (*Procyon lotor*), cottontail rabbit (*Sylvilagus floridanus*), and opossum (*Didelphis virginiana*) range throughout the watershed. Beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and river otter (*Lutra canadensis*) use most of the Whatcom Creek corridor and Lake Whatcom shoreline (AR #7).

Although highly developed for commercial and residential purposes, the central stream corridor, upper watershed forests, and open-space areas contain enough habitat diversity to support many bird species (AR #7). The Whatcom Creek corridor is considered a flyway for bald eagles (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*), merlin (*Falco columbarisu*), double-crested cormorant (*Phalacrocorax auritus*), kingfisher (*Ceryle alcyon*), great blue heron (*Andea herodias*), green-backed heron (*Butorides striatus*), gulls (*Larus* sp.), and a variety of dabbling and diving birds travelling between Bellingham Bay and Lake Whatcom. The Creek also offers narrow gorges with cascading water, habitat favored by American dipper (*Cinclus mexicanus*). Dense riparian vegetation offers preferred habitat for green-backed heron, possibly rails and a multitude of passerines, including neotropical migrants and resident species. Creek-side snags (many created by beavers) are utilized by great blue herons for roosting. Raptors use snags as hunting perches and a variety of woodpeckers forage and nest in the snags. Notable aggregations of swallows (*Hirundo* sp.) and swifts (*Cypseloides* sp.) are observed during the summer feeding on insects. Common mergansers (*Mergus merganser*) and bufflehead (*Bucephala albeola*) are also observed foraging in the Creek.

A variety of small reptiles and amphibians are also found in and along Whatcom and Hanna creeks (AR #7). Reptiles include the common garter snake (*Thamnophis sirtalis*), Northwestern garter snake (*Thamnophis ordinaoides*), rubber boa (*Charina bottae*), and Northern alligator lizard (*Elgaria coerulea*). Amphibians include the American bullfrog (*Rana catesbeiana*), Western toad (*Bufo boreas*), red-legged frog (*Rana aurora*), and a number of salamander species (*Ambystoma* sp., *Ensatina* sp., *Plethedon* sp.).

2.6 Wetland and Riparian Habitats

In 1990, approximately 335 acres of wetlands were inventoried in the Whatcom Creek watershed. Five years later, approximately 305 acres of wetland habitat were identified and the loss of wetlands is predicted to continue as further development occurs in the watershed (AR #7). Wetlands and riparian margins, particularly with associated undisturbed upland forests, provide habitat for a variety of reptilian and amphibian species. The combined loss of upland/wetland habitats and the fragmentation of remaining habitat constitute a significant loss of diversity and connectivity. The Whatcom Creek watershed wetland area is by far the greatest within the City and an important component of the remaining ecosystem (AR #7).

2.7 Threatened and Endangered Species

The Whatcom Creek watershed is known habitat for a number of species that are listed by both the Federal government (50 CFR 222-227) and the State of Washington (WAC § 232-12-297) as

endangered species or species of special concern. A complete list of Federal endangered and listed species can be found at www.nmfs.noaa.gov, and www.fws.gov. State species of concern can be found at http://www.wa.gov/wdfw/wlm/diversty/soc/concern.htm. Priority terrestrial species include the bald eagle (state threatened, federal threatened); common loon (*Gavia immer*), merlin, and pileated woodpecker (state sensitive); and Pacific Townsend's big-eared bat (*Plecotus townsendii*) (state candidate, federal species of concern). No federally or state-listed plant species were found within or adjacent to the project area during the vegetation surveys conducted in connection with this Incident (AR #15).

The National Marine Fisheries Service (NMFS) has jurisdiction over Pacific salmon and has identified distinct groups or Evolutionarily Significant Units (ESUs) for each species. Chinook salmon spawning in Whatcom Creek are included in the Puget Sound Chinook Evolutionarily Significant Units listed as threatened under the Endangered Species Act (AR #12). The Creek and its adjacent riparian areas are included in the critical habitat designation for the Puget Sound Chinook Evolutionarily Significant Unit. The Puget Sound chinook salmon is also a state candidate species of concern (AR #29).

Pacific lamprey (*Entosphenus tridentata*), a federal species of concern, also occurs in the Creek (AR #30).

2.8 Park Resources and Human Use

The Whatcom Creek watershed is an important location for fishing, recreation, leisure, education, exercise, and other uses. The simple existence of the watershed and its resources provides passive-use benefits to residents of the City and surrounding areas. The 240-acre Park contains a system of walking, cycling, and multi-use trails (AR #31). Prior to the spill, the City of Bellingham initiated a master plan to develop the Creek as a major trail greenway through Bellingham, focusing citizen attention on the opportunity to preserve and enhance the ecology of the Creek, its riparian habitat, and the visual quality for both wildlife needs and civic and recreation opportunities (AR #8, 9).

2.9 Historic and Cultural Uses

The Whatcom Creek watershed has a cultural past dating back thousands of years. Over time, the area has provided subsistence, water, lumber, shelter, and recreation for generations of residents. The earliest inhabitants were Native Americans, including the Lummi Nation and Nooksack Tribe. The Creek and other coastal streams and rivers of the region provided salmon and other subsistence staples of the tribal diet. These natural resources also form the basis for many tribal rituals and ceremonies. The Creek falls within the 1855 Point Elliott Treaty Area for the Lummi Nation and Nooksack Tribe (S. Doc. 319, 58-2, volume 2:43) (AR #138).

In 1792, Captain George Vancouver, commanding the H.M.S. Discovery, was one of the first European visitors to the region. Vancouver discovered and charted a natural deepwater inlet that he named Bellingham Bay in honor of Sir William Bellingham, Controller of the British Navy.

The first non-native settlers arrived in1852 and Whatcom County was officially organized as a county in 1854. Early industry focused on the natural resources of the region. Salmon processing and canning were once a major industry. The first cannery was built in 1886, and, by the turn of the century, there were twelve canneries operating within the county. The timber industry also has a long history in the region, and the forest-products industry, although declining, remains a major component of the regional economy. Today, the City of Bellingham is the county seat and the largest community in Whatcom County.

Pre-contact the Lummi Ancestors (*Xwlemi*) had all the names for Lummi lands (*Nilh Sneng'es Tengnexwqwen)* established in the Lummi language (*Xwlemi'chosen*). The place-names all relate to each other and portray specific uses or cultural significance for all Lummi lands, waterways, passageways, and usual and accustomed areas within the traditional territory. The Anglicized Whatcom Creek was actually called *Xwot'com*, which, in the *Xwlemi'chosen* structure, describes the sound made by 'rolling waters' derived from the large and small waterfalls in the stream. The *Xwlemi'chosen* dialect word for 'water' and 'drink' is *Qwo* and is represented by *Xwo* within the place-name itself. In addition, the significance of the rolling water is associated with the boiling motion at the base of the falls, where loose fallen rocks roll against the stream bedrock and make tumbling and rumbling sounds. Areas such as these have cultural significance associated with traditional cultural properties that portray the collective order and history, provide the "isolate" and relational linkages, and the association to other similar sites and areas.

The Lummi Nation temporary village area at the mouth of the Creek was used for canoe storage, fishing encampments, and drying and procuring salmon. The encampment was an isolated area between other salmon fishing and reef-net fishing areas. The encampment extended from a place in the north called *Sqwa'li'cum StoSto'lo* (referring to dog salmon (chum) and referencing the stream itself) commonly called Squalicum Creek, to the *TsiTsi'litch* area in the south, commonly called the Fairhaven district. Upstream in the *Xwot'com* creek watershed are the historic isolate areas used for hunting, gathering, and access to trails, waterways, lakes, and other historic and religious cultural sites pertaining to the salmon runs and tribal ceremony. From the falls area itself, the Tribe's ancestors used many of the known 312 native plant species for ceremony, medicine, and foods. They harvested red cedar trees, working them into cedar planks (used for building and house posts) and cedar canoes. The Tribe's ancestors also gathered the cedar bark, limbs, roots, and branches for basketry work. The *Xe'py* (Western red cedar) lined the stream banks that traditionally sustained the culturally significant salmon runs below the falls.

Environmental laws, including the National Historic Preservation Act of 1966 (12 U.S.C. §§ 470, *et seq.*), and the State Environmental Policy Act (SEPA) (chapter 43.21C RCW), require that impacts to cultural resources be considered during the public environmental review process. The National Historic Preservation Act requires that all Federal agencies consider cultural resources as part of all licensing, permitting and funding decisions. As part of that process, each agency must consult with the Washington State Office of Archaeology and Historic Preservation

(OAHP) to assure that cultural resources are identified and to obtain the formal opinion of that office on each site of significance and the impact of the proposed action upon the site.

A query of the Office of Archaeology and Historic Preservation database at http://www.ocd.wa.gov/info/lgd/oahp/register/index.tpl found a number of sites in the City of Bellingham that are listed in the National Register of Historic Places or the Washington Heritage Registry (AR #32). None of the listed sites were affected by this Incident, and the proposed restoration actions are not near any of the listed sites. Due to Federal and state statutory protections, however, the public listings do not include information on sensitive archaeological or cultural sites. The Trustees are in consultation with the Tribal Trustees and the Office of Archaeology and Historic Preservation to ensure that such sites are also undisturbed by the proposed restoration actions (AR #139,140).

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